CHAPTER 3. EXISTING CONDITION AND ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the physical, biological, social, and economic atmosphere of the project area and the effects of implementing each alternative on those environments. It also presents the scientific and analytical basis for the comparison of alternatives presented in the preceding chapter.

Specialist Reports

This EIS hereby incorporates by reference the following analyses that together comprise the Easy Fire Analysis Area.

- Forest Vegetation & Structure
- Terrestrial Wildlife
- Water Quality & Fish Habitat
- Soils
- Fuels
- Social/Economic
- Roads and Access
- Scenery
- Rangeland Resources and Noxious Weeds
- Heritage
- Botanical Resources
- Recreation & ROS

Specialist Reports in their entirety are contained in the Project Record (40 CFR 1502.21). These reports contain the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach the conclusions in this EIS.

Changes from the Draft to Final EIS for this Chapter

The following changes were made between the DEIS and FEIS. This listing does not include minor corrections to grammar, spelling, explanations, and paragraph formatting that have also been made. Some of the changes resulted from comments made to the DEIS.

General

- The effects of Alternative 5 were included in all the resource sections in Chapter 3 of the FEIS.

Forest Vegetation

- Discussion of shade cards was added to Shade and Microclimate and to Reforestation of Burned Forestland.
- The discussion of species and spacing to use in tree planting was updated.
- Added discussion on the effects if planting is delayed.

Terrestrial Wildlife

- Updated tables TW-3 and 4 in big game analysis.
- Additional discussion added to big game.
- Additional snag analysis and tables for DecAID under Primary Cavity Excavators.
- Addition of effects for Alternative 5 to the Wildlife BE, Appendix D.
- Addition of TES discussions.

Fish and Water Quality

- Updated Road Densities.
- Edited text to remove Reconstruction. There is a new definition for reconstruction and the 0.3 miles listed in the DEIS as reconstruction is now defined as maintenance.
- Updated maps for clarity.
- Included WEPP Analysis text and results.
- Updated text for updated grazing direction.
- Added discussion of Clean Water Act compliance.

Soils

- Included WEPP Analysis and discussion.
- Included discussions on effects to soil biota and mycorrhizae.
- Updated tables on expected soil conditions to include effects of Alternative 5.
- Reformatted and moved detailed tables of harvest units in alternatives and BAER burn severity acres to Soils Appendix C.
- Included maps of tractor harvest units and stream locations for Alternatives 2, 3 and 4 in Soils Appendix C.
- Included map of labeled ephemeral draws in Soils Appendix C.

Fuels

- Updated tables to include Alternative 5.
- Fuel Loading tons per acre and smoke tons per acre were calculated incorrectly for the DEIS and were corrected in the FEIS.

Economics/Social

- Timber values have been adjusted to reflect wood deterioration and an increase in timber indices.

- Discussion of human health and safety updated to reflect potential hazards to tree planters.

Roads and Access

- Updated road densities based on additional field review and update of INFRA database.

Heritage

- Updated the information in Consultation with Others, added a section on Tribal Interests, and updated the Environmental Consequences.

Other Disclosures

- Added analysis of unroaded areas.

Past, Present and Foreseeable Activities

Past Actions (Contributed to the Current Condition of the Analysis Area)

- Easy Fire suppression and rehab/BAER work; 5,839 acres (Summer/Fall 2002)
- Livestock grazing - Sullens C& H and Roberts Creek Allotments. The Sullens Allotment, located in the Bridge and Clear subwatersheds, is currently vacant or in non-use status; the Roberts Creek Allotment is located in the Reynolds Creek subwatershed. (Early 1900's to 2002).
- Past timber harvest in Clear, and Bridge Creek subwatersheds within the project area on NFS lands, includes partial harvest and regeneration harvests (late 1930's to 2002) and associated road construction and reconstruction. Timber sales since 1975 include D&D Shake II, Dry, Frosty, Lunch, Punch, Grouse, Jess Star, Knob Salvage, DL Salvage, Bridge LP, Rain, Ray, Star, Sleet LP, and Sun Demo and Foggy totaling approximately 1,180 acres in the project area.
- Past timber harvest in the Roberts Creek subwatershed on NFS lands, includes partial harvest and regeneration harvests (late 1930's to 2002) and associated road construction and reconstruction. Timber sales since 1975 include Morgue and Mossy totaling approximately 336 acres in the project area.
- There are no private lands within or directly adjacent to the project area. Within the subwatersheds, harvest on private land in 1980's and 1990's in Reynolds Creek subwatershed and Bridge Creek Meadows has occurred.
- Replanting conifers in old regeneration harvested areas that burned in the Easy Fire (2003, approximately 298 acres).
- Recreation activities including dispersed camping, hunting, and ATV use, snowmobiling (annual use).
- Hardwood planting (none within project area)
- Road maintenance including cutting of roadside hazard trees (2003)
- Road closures including gated or bermed closures and the decommissioning of roads have occurred since the late 1990's. These closures were prescribed in the Punch, Clear and Mossy decisions (Punch 1196, Clear 1997, Mossy 1997). A total

of approximately 70 miles of closures were identified.

- Mushroom picking (2005; annual event for the next 1-2 years)
- Firewood cutting (until 2002)
- Noxious weed manual control
- Precommercial thinning/handpiling (effects for treatments done prior to 1995 no longer discernable)
- Special use permit allowing water use out of Clear Creek for State road maintenance station (outside project area).
- Water withdrawal for irrigation Bridge Creek and Clear Creek (outside project area).

Present Actions

- Noxious weed manual control treatments
- Cutting of roadside hazard trees (annually).
- Maintenance of roads and culverts in fire area (annually).
- Recreation: dispersed camping, ATV use, snowmobile use (annually), mushroom picking.
- Full-size vehicle use on open roads and ATV use on open and closed roads (annually).
- Replanting conifers in old regeneration harvested areas that burned in the Easy Fire (2003, approximately 384 acres).
- Firewood cutting (outside of Easy fire area).
- Special use permit allowing water use out of Clear Creek for State road maintenance station.
- Water withdrawal for irrigation Bridge Creek and Clear Creek (outside project area).

Foreseeable Actions

- Livestock grazing (beginning as early as 2005 if recovery conditions are met and continuing annually).
- Firewood cutting (beginning in 2009 and continuing annually).
- Animal damage control to reduce pocket gophers numbers in conifer plantation outside RHCAs (2006).
- Riparian planting along selected stream channels in the Easy fire area.
- Roads planned for closure in existing EAs and ATM plans (Mossy and Clear EA's).
- Highway 26 Fuels Reduction Project (2007)
- Reynolds Allotment riparian fence construction (2005)
- Interim fuels treatments to reduce surface fuels less than 9 inch diameter recruited from standing dead and dying trees (over the next 10 years)

Forest Vegetation & Structure

Introduction

The vegetation burned by the Easy Fire forms a diverse pattern created by soil types, aspect, elevation, moisture and temperature regimes, natural disturbances, and past management activities. The fire burned within an area of approximately 5,839 acres of the Malheur National Forest, all of which were forested. About 3,002 acres burned severely over large areas, resulting in 90% or more mortality in trees. About 1,870 acres burned with moderate severity and included stands that were for the most part underburned, with fully consumed holes in the canopy, and relatively high mortality to individual trees. In the remaining light severity areas, about 749 acres burned in more of a mosaic pattern, with many more patches of tree survival or light to moderate underburns. About 61 acres were identified as having burned with partial severity. These areas were generally within the riparian zone of Clear Creek and burned hot in places and lightly in others. Only about 157 acres within the fire perimeter did not burn and consisted mainly of existing plantations. The Fire Severity Mapping section under General Existing Condition, this section, gives definitions of light, moderate, severe, and partial severity to vegetation. Figure 6, Map Section, shows the patterns of fire severity to vegetation.

Regulatory Framework

The National Forest Management Act (NFMA) requires that harvested lands be reforested within 5 years. The Forest Service has established a policy that this requirement is applied to salvage as well as to "green" timber sales. In addition, where no salvage is done, deforested lands should be reforested as quickly as practicable (Regional Forester, 2002).

The Malheur NF Land and Resource Management Plan provide Forest-wide management goals and objectives. The applicable standards for the forest vegetation portion of this analysis are:

- Maintain stand vigor through the uses of integrated pest management such as stocking level control and species composition in order to minimize losses due to insects and diseases.
- While favoring high quality natural regeneration, consider the effectiveness of various regeneration methods and prescribe the best site-specific method. Satisfactory stocking of any regenerated stand will be expected to occur within 5 years after harvest.
- Use seed collected from phenotypically superior trees from the same seed zone and elevation band for growing planting stock.
- Manage to maintain or re-establish ponderosa pine on sites where ponderosa pine is subclimax.

The Regional Forester's Eastside Forest Plan Amendment #2 gives additional direction for timber sales. Since none of the alternatives propose harvesting live trees (except for incidental amounts) this project is not subject to the ecosystem standard (HRV) but still must apply the riparian and wildlife standards. The applicable wildlife standards for the forest vegetation portion of this analysis are:

- If late and old structure (LOS) is below HRV, there should be no net loss of LOS. The ICBEMP terminology used in this document is old forest single-stratum or old forest multi-strata rather than late and old structure (LOS) forest.

- Manipulate vegetation that is not LOS so that it moves towards LOS. Where open, parklike stands occurred historically, encourage the development of large diameter trees with an open canopy structure.

Analysis Methods

Data about the Easy area was gathered using a variety of methods. While the fire was still uncontrolled, district resource specialists were on the ground advising the suppression forces on appropriate firefighting tactics and gathering information on fire effects. After the fire was controlled, the project silviculturist examined most of the timber stands and mapped the fire severity to the forest vegetation using aerial photographs flown after the fire. The stands were then stratified and “pre-cruise” plots were taken on a portion of each stratum. Formal stand exams were also taken on 10 stands.

Structural stage percentages are shown to the nearest percent. Some are at very low levels, but they are not intended to indicate a degree of precision closer than 5%.

The project area is defined as the National Forest lands within the perimeter of the Easy Fire. In order to adequately discuss cumulative effects, the analysis area includes surrounding private and Federal forestland outside the fire boundary to a distance where effects are no longer measurable.

The subwatersheds analyzed for effects include Clear Creek, Bridge Creek, and Mossy Gulch. There are no activities proposed in any alternative in the Dry Fork subwatershed, so there would be no effects in that subwatershed.

Mortality Rating

Tree survival is to be determined by applying a marking guide based on the mortality rating system described in the research publication titled “Factors Affecting Survival of Fire Injured Trees: A Rating System For Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains”, which was developed by Scott, et al, 2002 and revised by Scott, et al, with Amendment 1 in 2003. The factors used in the rating guide are based on a large number of references to scientific papers, many pf which have been peer reviewed. The rating system has been reviewed and adjusted over the last year by field evaluation by local silviculturists, marking crew foremen, and the authors across the three Blue Mountain National Forests. While no guide can realistically account for all of the factors that affect survival, the current guide is currently the “state of the art” for determining tree survivability after wildfires and is applicable to the Easy Fire Recovery Project Area.

Since this is a new rating system and actual validation studies have not been conducted, it is impossible to accurately determine an error rate of misclassifying survivability of fire-injured trees. To do so, long-term monitoring plots have been established on the Monument Fire (Malheur National Forest) in conjunction with the PNW Research Station to monitor tree survival over the next 5 years. Additional plots in other wildfire areas will be established in the near future.

Biophysical Environments

Specific plant species tend to be found together in a characteristic set of ecological conditions. The unit of classification based on the probable, or projected, climax plant community type is termed the “Plant Association”, and may be used to describe and classify sets of ecological conditions. The Plant Associations found within the Easy planning area are documented in

Plant Associations of the Blue and Ochoco Mountains (Johnson & Clausnitzer, 1992). For purposes of classification and analysis, plant associations were grouped into areas with like temperature/moisture and fire disturbance regimes called Plant Association Groups, or PAGs. These PAGs were then further grouped into Potential Vegetation Groups (PVGs). The document being used for grouping PAGs and PVGs on the Malheur National Forest is the "Blue Mountain National Forests Forest Planning Decision Document," July 18, 2002. The Plant Association Groups will be used to classify biophysical environments for description and analysis.

Stand Development

In order to compare the project alternatives, the growth of the naturally reforested stands and planted stands was tracked into the future and is displayed in the Forest Vegetation and Structure Specialist Report. This shows the time to produce old forest structures. The goal of this analysis is to compare the alternatives in a consistent manner. The growth projections do not necessarily predict the actual growth expected to occur, as they do not take into account all factors that could affect tree growth. To be consistent, several assumptions have been made to simplify the analysis. Stand density management by periodic thinning and underburning is likely to occur into the future and is assumed to take place. No large-scale disturbances such as stand replacement fire or insect infestations are included.

Stand establishment has been estimated to take 5 years if planted. Natural reforestation would take 10 to 20 years if within the seed fall zone (within 800' of live trees). It could take as long as 20-50 years if outside the seed fall zone. Growth was then projected to be 1.5 inches DBH per decade. To reduce the success of bark beetle attacks, 1.0 inch DBH per decade is considered the minimum growth rate and a growth rate above 2.0 inches DBH per decade can indicate an understocked stand. The midpoint of the range (1.5 inches DBH per decade) was selected as a conservative number based on the general objective to grow stands between 1.0 inch and 2.0 inches DBH per decade.

When used in this section, "short-term" means in the next 20 years and "long-term" means over 20 years. Benchmarks were selected at 50, 100, and 150 years to display the structural stage difference between the alternatives at various times in the future. These roughly are the times when stages grow from one to another.

Historical Conditions

Many of the forests in the West have been altered from their historical condition since Euro-American settlement. This has occurred as a result of fire suppression, logging, cattle grazing, and other activities. There is an increasing realization that the forests of the Blue Mountains evolved with the fire, insects, and other periodic disturbances that occur here and that the historical condition was often more resilient and sustainable than the present condition.

The cold dry, cool dry, and cool moist biophysical environments historically had more ponderosa pine and western white pine in the overstory, and less grand fir in the understory.

The warm dry biophysical environments were typically composed of large ponderosa pine and western larch at fairly wide spacing and there was little conifer undergrowth. Periodic low intensity ground fires kept fuel loads at low levels, killed conifer regeneration, and kept the trees thinned. The low levels of ground fuels and the lack of fuel ladders from the ground to the tree crowns reduced the amount of crown fires and the widely spaced crowns did not allow crown fires to spread for long distances. With the wider spacing, the trees grew at sufficient growth rates to allow them to better resist bark beetles.

The vegetation has evolved with periodic disturbances characteristic of the region and is adapted to surviving them. The desired condition is to move the forest toward the historical condition for each biophysical environment. This will reduce the risk of uncharacteristically severe fire and restore ecological structure, function, and processes to the forest.

Cumulative Effects

The list of actions in the beginning of Chapter 3 was used to analyze the Cumulative Effects. Each one was considered to see if any of them, in combination with the actions proposed for the Easy Fire Recovery Project, had a measurable effect. Those that did were discussed further in the Cumulative Effect sections that follow each topic.

General Existing Condition

Biophysical Environments

The entire Easy Fire Project Area is classified as Forested. Table FV-1 displays the Plant Association Groups (PAG) that occurs in the Easy Fire area. See Figure 8, Map Section for forest type distribution.

Table FV-1: Percent of Project Area by Potential Vegetation Group and Plant Association Group.

Potential Vegetation Group	Acres	Percent
Cold Upland Forest PVG		
Cold Dry PAG	3,005 Acres	51%
Cool Dry PAG	329 Acres	6%
Moist Upland Forest PVG		
Cool Moist PAG	754 Acres	13%
Dry Upland Forest PVG		
Warm Dry PAG	1,751 Acres	30%
Total Area in Easy Project Area	5,839 Acres	100%

The following sections describe the biophysical environments found in the project area, and the past (pre-fire) and potential vegetation of those environments. The existing vegetation has been greatly modified by the Easy Fire that occurred in July 2002. Many stands were killed or damaged, bringing them far from the desired condition described in Chapter 1 for each biophysical environment.

Table FV-2 below, displays acres by severity to vegetation for each plant association group, or biophysical environment. The predictions of mortality were determined following the recommendations in "**Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue Mountain and Wallowa Mountains**", Scott, et al., 2002, and Amendment 1, 2003 (Forest Vegetation Project Record) which identifies trees that are already dead and trees expected to die.

Table FV-2: Burn Severity Acres within Project Area by Plant Association Group

Plant Association Group	Partial Burn (acres)	Light Burn (acres)	Moderate Burn (acres)	Severe Burn (acres)	Total Burned (acres)	Not Burned (acres)	Total in Project Area (acres)
Cold Dry	61	323	589	1949	2921	84	3005
Cool Dry	0	109	57	156	321	7	329
Cool Moist	0	52	380	287	718	36	754
Warm Dry	0	266	846	610	1721	30	1751
TOTAL	**61**	**749**	**1870**	**3002**	**5682**	**157**	**5839**

Cold Dry and Cool Dry Plant Association Groups

These areas are in the Cold Upland Forest PVG. They contain lodgepole pine and grand fir plant associations and together cover about 3,334 acres (57%) of the project area. The Cold Dry PAG is the most common PAG in the Easy Fire project area, covering 51% of the project area. They occur throughout the upper elevations with flat topography and on northeast aspects within the fire area. These associations represent both grand fir climax and lodgepole pine climax forests.

Grand fir are present as the climax species in about 90% of the area in cold dry and cool dry PAGs, where the absence of disturbance (fire) has allowed the forest vegetation to be dominated by grand fir.

Lodgepole pine are present as the climax species in about 10% of the cold dry and cool dry PAGs within the fire area, mainly in the colder "frost pocket" areas and where stand replacing fires occur at intervals frequent enough (70-120 years) to maintain lodgepole as the dominant species.

Associated species include Douglas-fir, western larch, and Engelmann spruce, with minor components of ponderosa pine, and western white pine. Western white pine probably comprised a higher proportion of the species mix historically, but its proportion has been reduced as a result of mortality from white pine blister rust. Ponderosa pine also likely comprised a higher proportion historically, but has diminished due to past harvesting practices of selecting the largest trees for harvest, and also due to increased competition from fire intolerant species such as grand fir.

The cold dry and cool dry PAGs generally have a low frequency, high severity fire regime. In the lodgepole pine associations, trees grow close together and form dense stands subject to stagnation and bark beetle attacks that often result in high mortality. Stands burn with great vigor due to heavy fuel loads, usually resulting in complete mortality. In the grand fir associations, dense multi-storied stands with shade tolerant grand fir in the understory are susceptible to high severity fires due to the multi-storied structure which allows fires to move from the ground into the crowns.

Pre-Fire Stand Conditions

In the last 25 years, about 730 acres of regeneration harvests have taken place within these areas. Tree density was high in younger stands, but older stands were becoming more open due to high mortality rates from disease and insect infestations (mountain pine beetle in lodgepole pine, spruce budworm and fir engraver in grand fir, and Armillaria root disease in grand fir and Douglas-fir), which created an abundance of standing and downed fuel.

Post-Fire Stand Conditions

In the cold dry and cool dry plant association groups, approximately 2,751 acres (82%) burned with moderate to high severity to the vegetation. The result is a higher percentage of the fire area is now in the stand initiation and understory reinitiation stages than would have occurred historically (see discussion in Stand Structural Stages section of this report). In a few areas, creeping ground fire burned in a mosaic pattern, leaving some islands untouched. Lodgepole pine, subalpine fir, and Engelmann spruce are not expected to live because of bole scorch due their very thin bark. Smaller diameter grand fir and Douglas-fir are also not expected to survive. Though most trees in these stands are not fire tolerant species, some may survive because they sustained very little scorch or were missed by the fire.

Cool Moist Plant Association Group

This plant association group is in the Moist Upland Forest PVG. The plant associations within the Easy Fire area that are in this PAG are grand fir climax plant associations and cover about 754 acres (13%) of the project area. They are found mainly in the mid to upper elevation slopes with northwest to northeast aspects and in moist draws and riparian areas. Early successional stages are dominated by lodgepole pine and western larch, while later stages show increased proportions of grand fir, Douglas-fir, subalpine fir, or Engelmann spruce (in wetter areas). Western white pine probably comprised a higher proportion of the species mix historically, but its proportion has been reduced as a result of mortality from white pine blister rust. Ponderosa pine also likely comprised a higher proportion historically, but has diminished due to past harvesting practices of selecting the largest trees for harvest, and increased competition from fire intolerant species such as grand fir.

The cool moist PAGs generally had a low frequency, high severity fire regime. Dense, multi-storied stands with shade tolerant grand fir in the understory are susceptible to high severity fires due to the multi-storied structure. Such an atmosphere promotes fire movement from the ground into the crowns of trees.

Pre-Fire Stand Conditions

In the last 25 years, about 130 acres of regeneration harvests have taken place within these areas. Tree density was high in younger stands, but older stands were becoming more open due to high mortality rates from disease and insect infestations (mountain pine beetle in lodgepole pine, spruce budworm and fir engraver in grand fir, and Armillaria root disease in grand fir and Douglas-fir), which created an abundance of standing and downed fuel.

Post-Fire Stand Conditions

In the cool moist plant association group, approximately 667 acres (88%) burned with moderate to high severity to the vegetation. The result is a higher percentage of the fire area is now in the stand initiation and understory reinitiation stages than would have occurred historically (see discussion in Stand Structural Stages section of this report). Lodgepole pine, subalpine fir, and Engelmann spruce are not expected to live because of bole scorch due their very thin bark. Smaller diameter grand fir and Douglas-fir are also not expected to survive. Though most trees in these stands are not fire tolerant species, some may survive because they sustained very little scorch or were spared by the fire.

Warm-Dry Plant Association Group

The mid-elevations (5,000 to 6,300 feet) on southwest slopes generally contain plant associations in the warm dry plant association group. These areas contain plant associations with seral ponderosa pine and climax grand fir covering approximately 1,751 acres (30%) of the project area. Douglas-fir and western larch were components in many of these stands, as were incidental amounts of lodgepole pine.

The natural fire regime is one of somewhat frequent, low intensity, non-stand replacement fire. Trees typically grow in small clumps of about the same age in stands generally dominated by larger ponderosa pine and few understory trees and shrubs. Tree density is somewhat light, resulting in open stands and good growing room that maintains tree vigor. Mortality from fire is light and patchy. Rarely is the whole stand killed. Natural reforestation of small patches is often effective, but large seed does not disperse very widely with the wind.

These areas were the most changed from historical conditions, especially the species composition. The increased stocking and changed species composition contributed to the high severity fire, compared to what would be expected in the historical stand conditions.

Pre-Fire Stand Conditions

Many stands were partially harvested starting about 60 years ago. More recently, regeneration harvest occurred in about 189 acres and about 199 acres have been precommercially thinned. In general, fire exclusion and harvest of mature seral species trees led to an increase in Douglas-fir and grand fir, an increase in fuel levels, and greater stand densities. These conditions led to higher fire intensity during the Easy Fire and greater tree mortality. Bark beetles and dwarf mistletoe were at higher levels than would be expected under historical conditions.

Post-Fire Stand Conditions

Approximately 1,456 acres (83%) burned with moderate to high severity to the vegetation in the warm dry plant association group. The result is a higher percentage of the fire area is now in the stand initiation and understory reinitiation stages than would have occurred historically (see discussion in Stand Structural Stages section of this report). Many of the Douglas-fir and grand fir found in these stands were killed by fire. A few of the larger, thicker-barked Douglas-fir and grand fir may survive. Many of the large ponderosa pines are not expected to survive due to the deep bark scale piles at the base of the trees. The scale piles are especially problematic for those pine trees with poor crown rations. Often, the deep litter around the base of ponderosa pines burned or smoldered for long periods of time killing the cambium and thus causing tree mortality.

Fire Severity Mapping

Fire severity mapping was completed for the Easy Fire Area using a combination of "special flight" aerial photos of the Easy Fire, and ground verification and is displayed in Figure # 6, Map Section. Fire severity mapping was used extensively during proposed action development, and is referenced in proposed action descriptions. The following definitions are drawn from "Vegetation Response after Wildfires in the National Forests of Northeast Oregon" (USDA, 1998).

Light Burn

- Forest Vegetation: leaves and twigs on tree branches partially to completely scorched; mature trees mostly underburned.
- Shrubland/Grasslands: shrubs with some singed/consumed leaves, but majority unscathed; grasses with standing culms (singed or blackened); and tufts with surface char at most.
- Substrate: litter charred to partially consumed in forest communities; litter unscathed to partially consumed in grasslands.

Moderate Burn

- Forest Vegetation: leaves and small twigs on tree branches completely scorched; stems and tree trunks charred and partially burned.
- Shrublands/Grasslands: shrubs with consumed and singed leaves, stems blackened; grasses with culms consumed or blackened; tufts charred with unburned crowns.
- Substrate: litter and woody debris partially consumed, and logs blackened in forest communities; litter partially consumed in grasslands and shrublands.

Severe Burn

- Forest Vegetation: all leaves, stems, and twigs on tree branches consumed; trees and tree trunks deeply charred, with branches mostly consumed.
- Shrublands/Grasslands: shrubs consumed with only blackened stubs above the ground surface; grasses with culms consumed; tufts consumed or crown blackened.
- Substrate: litter and duff consumed; white ash prevalent; logs deeply charred or consumed.

Partial Burn (Mosaic)

- Contains a mixture of burn severities, with no single severity dominating.

Existing Condition - Living Trees

Areas of living trees occur around the fire perimeter and are also scattered within the fire perimeter, usually in areas of low fuels, flat topography, lower stand density, and in stands of fire tolerant species.

Within the fire perimeter, approximately 3,002 acres (51%) of the locale burned with high severity to the vegetation, killing virtually all trees in those stands. Standing snags and downed logs that existed before the fire were largely consumed by the fire.

Approximately 1,870 acres (32%) of the forested area burned with moderate severity to the vegetation. Some western larch, ponderosa pine, and large diameter Douglas-fir and grand fir are expected to survive. The balance of trees in these stands is expected to die of basal, root, or crown scorch. Stand structure remains in the scattered large overstory trees, but stands will be very open. Most of the snags and downed logs existing before the fire were consumed by the fire.

Approximately 749 acres (13%) of forested acres burned with low severity to the vegetation. Most of these areas were existing plantations. These areas had fuel reduction treatments in the past and served as fuel breaks during the fire.

About 157 acres (3%) of the forested area did not burn, mostly in existing plantations and riparian areas.

Table FV-3 displays the amount of each subwatershed that burned and the severity to the trees.

Table FV-3: Subwatershed (SWS) Acres Burned

Subwatershed	Partial Burn (acres)	Light Burn (acres)	Moderate Burn (acres)	Severe Burn (acres)	Total Burned (acres)	Total in Project Area Not Burned (acres)	Total in Project Area (acres)	Total Area in Subwatershed (acres)
Bridge Ck.	0	304	78	482	865	78	943	12,149
Clear Ck.	61	261	1,330	2,084	3,737	42	3,779	12,484
Dry Fork	0	4	24	0	28	0	28	11,219
Reynolds Ck.	0	179	438	435	1,053	37	1,090	19,915
TOTAL	61	749	1,870	3,002	5,682	157	5,839	55,767

Insects and Disease In Live Trees

Some of the remaining live trees have been fire damaged and are at greater risk to die within the next two or three years from drought, disease, and insects. Some localized mortality is likely, particularly ponderosa pine trees that had low vigor before the fire and that sustained crown scorch and bole scorch. Large ponderosa pine are especially susceptible to bole scorch due to mounds of bark scales around their bases that burn for a long time and partially girdle the trees. Fire-damaged Douglas-fir 15”dbh or larger are particularly susceptible to bark beetles.

Live trees are found in stands that burned with partial, low, or moderate severity (about 2,680 acres), and in areas that did not burn (about 157 acres), for a total of about 2,837 acres.

Grand fir

Grand fir is host to many insect and disease pests. Spruce budworm attacks will likely be reduced due to a number of factors. The lack of host trees, a more open and thus warmer environment, and the reduction of multi-story forest structure will likely inhibit Spruce budworm activity. Fir engraver is not as aggressive as the Douglas-fir bark beetle, but can cause mortality to true fir trees with heavy damage.

Grand fir is highly susceptible to Armillaria root disease. Grand fir infected with root rots are more likely to succumb if weakened by fire damage. Fire is not expected to have a significant effect on disease inoculum in the soil, although subsequent disease activity will be determined by the species composition that eventually develops and is maintained in the burn area. Some

Annosus root disease had been occurring prior to the burn. S-Type Annosus infects true firs and often causes substantial mortality, especially in stands with high levels of disturbance. Infection is not believed to occur to harvested trees that have been dead for more than one year.

Fire scars on trees not killed by the fire may serve as entry points for some disease and insects, which can cause future damage and mortality. Fire scarred young grand fir trees may develop into suitable bear den trees many years later.

Douglas-fir

Douglas-fir bark beetles are expected to spread widely and attack fire-injured trees, eventually killing most trees with intermediate or heavy fire damage. Research has shown that Douglas-fir bark beetles infest 80-90 percent of Douglas-fir with greater than 20 percent crown scorch. Don Scott, Blue Mountain Zone Entomologist for the Forest Service, predicts beetle activity in Douglas-fir trees greater than 15”dbh that sustained moderate to severe fire damage.

Dwarf mistletoe in Douglas-fir will continue to weaken trees that survived the fire. Mistletoe can be a serious problem for Douglas-fir, forming large brooms, which reduce growth and eventually weaken the tree. Mistletoe increased the flammability of individual trees in the fire perimeter and increased the amount of mortality to infected trees. Therefore, the overall incidence of mistletoe in Douglas-fir will be greatly reduced. Douglas-fir is also highly susceptible to Armillaria root disease.

Ponderosa pine

Insects can be expected to attack trees weakened by the fire or growing in a weakened condition prior to the fire. Ips beetles colonize freshly killed trees and, if the populations build up to epidemic levels, can spill over into remaining live trees. Western and mountain pine beetles attack weakened trees and can also spread into nearby stands. Damaged trees often undergo drought stress that can cause a reduction of pitch pressure, which is their defense against bark beetles. Annual volume of mortality to bark beetles in the three years following a fire rises 300 to 1,400 percent from pre-fire levels.

Dwarf mistletoe in ponderosa pine will continue to weaken trees that survived the fire. Mistletoe increased the flammability of individual trees. As a result, the amount of mortality to trees was increased and the overall incidence of mistletoe has been reduced in the area.

Ponderosa pine is intermediately to highly susceptible to Armillaria root disease, depending upon locality and site conditions. Ponderosa pine should be included as a minor component in the species mix used to reforest Armillaria-infected sites. P-Type Annosus root disease may be occasionally observed in ponderosa pine in this area, but incidence of this disease in pine is much higher in dryer community types. Annosus can develop on these high-risk sites following multiple partial removals where stumps are infected by airborne spores and residual trees and tree regeneration is more susceptible because of stress and low vigor.

Western larch

There are few insect or disease problems in western larch. Mistletoe is the one exception and can cause decline and eventual mortality due to stripping the branches off of the bole of the tree. Mistletoe increases the mortality of the infected trees, which has somewhat reduced the overall incidence of mistletoe in western larch. Western larch trees are seldom damaged by root diseases and larch is naturally favored to reforest sites to which larch is adapted that have known Armillaria root disease infections.

Lodgepole pine

Most of these stands burned completely and will have no insect or disease problems, other than root diseases that could infect new tree roots. The main pathogens for lodgepole pine are bark beetles in stagnated lodgepole pine stands. Lodgepole pine is tolerant to Armillaria root disease, and should be included in the mix of species used to reforest infected sites.

Western White Pine

Western white pine naturally occurs as a minor component throughout this portion of the Blue Mountains. However, fewer white pine remain than found at historic levels due to harvest, white pine blister rust, mountain pine beetles, and stand conditions that restricted recruitment of regeneration. White pine is highly vulnerable to the high level of stocking that occurs in the absence of disturbance in grand fir plant communities.

Western white pine is susceptible to mountain pine beetle and emarginate ips, and is the principal host for the ips beetle. Bark beetles are largely responsible for much of the reduction of white pine stocking in mixed conifer stands.

White pine blister rust is the most serious damaging agent of western white pine. Breeding programs have produced strains that are 65 percent resistant to intense exposure to white pine blister rust. Western white pine is tolerant to Armillaria root disease and should be included in the species mix for adapted diseased sites and uninfected sites as well.

Engelmann Spruce

The spruce beetle is the most serious insect pest of Engelmann spruce. Outbreaks are associated with extensive windthrow because downed trees provide a good food supply, causing a rapid expansion of beetle populations. Spruce beetles often develop into high populations in distant stands and then search out mature susceptible stands in areas as far as 30 miles away.

The most common disease of Engelmann spruce is caused by tomentosus root disease, which results in root or butt decay. Probably the greatest effect of root and butt decay is predisposing trees to failure and windthrow, and subsequent bark beetle activity. Engelmann spruce is intermediately susceptible to Armillaria root disease, and is seldom damaged by Annosus root disease.

Subalpine Fir

Subalpine fir is attacked by numerous insects. The most destructive are the western spruce budworm, western balsam bark beetle, and balsam woolly adelgid. The balsam woolly adelgid, an exotic insect, has been killing subalpine fir at epidemic levels throughout the Blue Mountains for at least the last 15 years. Often the majority of trees are killed over several years of infestation. Other insects also damage subalpine fir, including Douglas-fir tussock moth, western black-headed budworm, and fir engraver beetle.

Subalpine fir is highly susceptible to Armillaria and Annosus root diseases. Subalpine fir is also susceptible to several other wood rotting fungi that cause heart, trunk, butt, or root rots, especially after wounding. Trees weakened by wood rots often become infested by fir engraver beetles and usually succumb to windfall and breakage.

Root Diseases

Armillaria root disease (Armillaria ostoyae), which causes root rot, and Annosus root disease (Heterobasidium annosum), which causes root and butt rot, are present in the fire area. There are three large pockets of Armillaria within the fire boundary, consisting of a total of about 1,400 acres within the fire perimeter. The extent of these root disease centers probably has not increased much in the last 120 years, but the Armillaria did become more active in those areas. The main reason for increased activity is that there has been a succession from seral pines and western larch dominated stands to stands dominated by true firs. Armillaria root disease, due to the large area infected, and the obviously virulent strains of the fungus present, is a greater concern than other root diseases.

The largest Armillaria root disease complex in the Blue Mountains lies within portions of Reynolds and Clear Creek drainages, partially within the Easy fire. In addition, the largest known root disease individual organism in the world, a confirmed single Armillaria ostoyae genotype covering 2,800 acres is partially located (1,150 acres) within the Easy Fire project area (USDA, 2001).

The relationship of Armillaria and fire is complex. Some research has shown that periodic fire modifies the fungal community in the soil such that other fungi compete with Armillaria. Specifically, fungi of the genera Trichoderma, which compete with and are antagonistic to Armillaria ostoyae, are becoming more common in recently burned soils (Reaves et al., 1990). Fire helps maintain a beneficial soil fungal population, and more importantly, restores historical conifer species composition. Pre and post fire biomass studies show the population of Trichoderma increases somewhat after a fire and Armillaria decreases somewhat. Fire will not get rid of a root disease center, but will tip the balance slightly in favor of Trichoderma species. However fire is not effective in reducing Armillaria inoculum in the soil or significantly reducing its infection potential. Even in cases where stumps burn out, infection still occurs years later when roots of regeneration contact remnants of roots buried in the soil (USDA, 2001). Based on the above literature, the Easy Fire probably did not reduce the presence of Armillaria to an appreciable degree.

The primary difficulty in successful management of root disease-infected forests is the long-term persistence in the soil of the fungi that cause root diseases. These pathogens, living on dead root systems can persist for decades, infecting susceptible trees that encounter the material via root contacts. Trees weakened by root diseases are attractive to bark beetles as a result of their reduced vigor and resistance (USDA, 2001).

While all conifers may become infected with Armillaria, western larch, western white pine, and lodgepole pine are most resistant to Armillaria in nearly all cases. Grand fir, Douglas-fir and subalpine fir are highly susceptible. Ponderosa pine is highly to intermediately susceptible and Engelmann spruce is intermediately susceptible.

Trees that are planted even those of relatively resistant species are more apt to become infected than naturally established trees. Even trees planted correctly will not develop as healthy a root system as that of a tree that has established naturally (USDA, 2001). Large acreages that were burned severely in the Easy fire will make it difficult to rely on natural regeneration in many cases, however, due to lack of a nearby seed source.

There are several reasons that Armillaria has become more aggressive in this area. Fire exclusion over the last 100 years or so has allowed shade tolerant, fire intolerant species such as grand fir, to invade warm dry environments that were predominantly ponderosa pine. On the cold dry, cool dry, and cool moist sites, grand fir has become more prevalent and denser in the understory than found previously. In addition, past practices of selective harvesting of seral pines and larch have contributed to an abundance of grand fir and Douglas-fir (USDA, 2001). Site disturbances, such as compaction of ash-based soils during the wet seasons in combination with high skid trail density, have resulted in residual tree wounding. Such wounding can increase the incidence and severity of root diseases. Partial cutting gives the Armillaria fungus lots of stumps and root systems to colonize. However, there are also large Armillaria pockets in some of the untouched parts of the Easy fire area as well. The strains of Armillaria ostoyae that occur on the Prairie City Ranger District seem to be particularly virulent and aggressive. Western spruce budworm defoliation, which occurred from 1980 until 1992, weakened grand fir, Douglas-fir, subalpine fir, and Engelmann spruce trees and predisposed them to root disease. All these factors contribute to the increase in severity and spread of root disease in the Easy project area.

Fire Hazard to Live Trees

Live trees are found in stands that burned with low, moderate, and partial severity (about 2,680 acres) and in the areas that did not burn (about 157 acres) for a total of about 2,837 acres. The fire burned most of the ground fuel and killed many of the “ladder fuel trees” in stands. Currently, fire hazard to live trees is low.

Environmental Consequences - Live Trees

Insects and Disease

Direct and Indirect Effects

Effects Common to Alternatives 1, 2, 3, 4, and 5

Live trees are found primarily on approximately 2,837 acres in stands that burned with low or moderate severity.

Dead trees can provide habitat for insect buildups that can then cause additional mortality in nearby live trees. There can be a big brood of insects the first season after a fire that then falls off as the source of freshly killed trees diminishes. Insect outbreaks in the second and succeeding years are generally of lesser magnitude. Immediate salvaging (before the next summer) of infested trees prior to the insects dispersal to nearby live trees can reduce the risk of additional mortality.

Due to the length of time necessary for NEPA analysis and documentation, it was not possible to salvage trees in the summer of 2003. However, salvaging trees after the first season may result in a small decrease of insect activity and mortality in surrounding live trees in succeeding years.

Effects of Alternative 1 (No Action)

Among all of the alternatives presented, Alternative 1 (No Action) leaves the most dead and dying trees in place and would present the most risk of mortality from insect buildups to remaining live trees. It also relies totally upon natural regeneration. While it is not expected that any of the alternatives would result in a significant increase in incidence or spread of Armillaria, the resulting species mix in these naturally regenerated stands would consist of a higher proportion of grand fir and Douglas-fir. Both species are highly susceptible to Armillaria root disease and would exist in higher proportions than in Alternatives 2, 3, 4, and 5 (which would plant species that are more resistant to Armillaria). Hence, the No Action alternative may result in a slightly higher incidence of mortality to regeneration caused by Armillaria than all the other alternatives.

Effects Common to Alternatives 2, 3, and 4

Alternatives 2, 3, and 4 would plant the same number of acres with conifers. The species mix in the planted areas would include western larch, western white pine, ponderosa pine, and Douglas-fir, all of which have some resistance to Armillaria root disease except Douglas-fir. In known root disease centers, Douglas-fir would not be part of the planted species mix. Alternatives that harvest more acres within known Armillaria root disease centers with tractor yarding may have a slightly increased risk of resulting in spread of Armillaria than other alternatives.

Effects of Alternative 2

Alternative 2 leaves the least number of dead and dying trees, so it has a slightly lower risk of additional mortality from insect buildups than the other action alternatives.

This alternative plants the same number of acres with conifers as Alternatives 3 and 4, but harvests about 248 acres within known Armillaria centers with tractor yarding. Tractor yarding can potentially result in increased occurrence of soil compaction and tree wounding, which, in turn can increase the incidence and severity of root diseases. Therefore, Alternative 2 has a slightly higher risk of increasing the incidence and severity of Armillaria than Alternatives 3 and 4.

Effects of Alternative 3

Alternative 3 leaves more of the dead and dying trees than Alternative 2 and would have a slightly higher risk of additional mortality from insect buildups compared to Alternative 2.

This alternative plants the same number of acres with conifers as Alternatives 2and 4, but harvests about 237 acres within known Armillaria centers with tractor yarding. Tractor yarding can potentially result in increased occurrence of soil compaction and tree wounding, which, in turn can increase the incidence and severity of root diseases. Since Alternative 3 harvests fewer acres with tractor yarding than Alternative 2, it has a slightly lower risk of increasing the incidence and severity of Armillaria than Alternative 2.

Effects of Alternative 4

Alternative 4 leaves more dead and dying trees than any other action alternative, and would place the remaining live trees at the more risk of additional mortality from insect buildups compared to both Alternatives 2 and 3.

This alternative plants the same number of acres with conifers as Alternatives 2 and 3, but harvests about 234 acres within known Armillaria centers with tractor yarding. Tractor yarding can potentially result in increased occurrence of soil compaction and tree wounding, which, in turn can increase the incidence and severity of root diseases. Since Alternative 4 harvests fewer acres with tractor yarding than Alternatives 2 and 3, it has a slightly lower risk of increasing the incidence and severity of Armillaria than Alternatives 2 and 3.

Effects of Alternative 5

Alternative 5 removes dead and dying trees that are less than 7" diameter, so there would be a slight reduction of risk of mortality from insect buildups compared to the No Action alternative. However the larger diameter dead and dying trees would remain on site, so this risk would be slightly higher than for Alternatives 2, 3, and 4.

This alternative proposes to plant fewer acres with conifers than Alternatives 2, 3, and 4 so there would be fewer acres reforested with species that have some resistance to Armillaria. However, this alternative proposes no tractor harvesting so the risk of increasing the incidence and severity of Armillaria would be less than Alternatives 2, 3 and 4, but more than Alternative 1.

Cumulative Effects

Effects Common to All Alternatives

Roadside hazard trees would be felled and left in place, so there would be little reduction in insect buildups from falling hazard trees.

Fire Hazard to Live Trees

Direct and Indirect Effects

Effects of Alternative 1 and 5

Under these alternatives, no timber salvage would take place. The lack of dead tree salvage would result in an increased fire hazard to the remaining live trees as the dead trees fall down over the next few years. The effect of leaving such high fuel loadings would be that any fire 10 years or more from now would be higher in intensity and could kill most of the natural regeneration and many of the remaining live trees, compared with Alternatives 2, 3, and 4. Alternative 5 does propose piling and burning of small diameter (less than 7 inch diameter) fuels, which would temporarily reduce fire hazard to live trees as compared with Alternative 1, but would not reduce fire hazard to live trees in the future, when the larger trees begin falling down.

Effects Common to Alternatives 2, 3, and 4

In all three of these alternatives, trees expected to survive the fire are to be left, except for safety concerns and as necessary to facilitate harvest systems. Alternatives harvesting more snags reduce the future fire hazard more than the alternatives that harvest fewer dead or dying trees.

Effects of Alternative 2

Alternative 2 harvests the greatest number of dead trees and reduces future fire hazard to remaining live trees more than any of the other alternatives.

Effects of Alternative 3

Alternative 3 leaves fewer numbers of snags within harvest units for wildlife, but only harvests a portion of the area that Alternative 2 harvests, so it leaves a higher number of snags than Alternative 2 overall.

Effects of Alternative 4

Alternative 4 leaves the highest number of snags within harvest units and harvests a smaller portion of the fire area compared to both Alternatives 2 and 3. Therefore, Alternative 4 poses the highest future fire hazard of the three salvage alternatives.

Cumulative Effects

Effects Common to All Alternatives

Roadside hazard trees would be felled and left in place, so there would be little reduction in fire hazard from falling hazard trees.

Existing Condition - Shade and Microclimate

Shade generally covers 30 to 70 percent of the ground in conifer stands. In the intensely burned areas, shade has been reduced to between 5 and 20 percent. This has increased the amount of solar radiation reaching the ground. The resultant higher temperatures have changed the microclimate for plants. Vegetation that is well adapted to warmer temperatures and full sunlight will benefit compared to vegetation that grows in shade and desiccates rapidly. This environment will favor seral species such as western larch, lodgepole pine, and ponderosa pine establishment over grand fir and Douglas-fir. In addition, the amount of ground vegetation and shrubs will increase compared to that which existed under closed forest conditions prior to the fire.

The shade that crosses the forest floor as the shadows of trees follow the position of the sun through the day, covers a much greater portion of the ground than the numbers shown above. This transient shade is expected to be adequate to reduce drought stress in tree seedlings and to increase survival, except in higher severity burned areas on south and west slopes throughout the project area.

Environmental Consequences - Shade and Microclimate

Direct and Indirect Effects

Effects of Alternative 1 (No Action)

Under the Alternative 1 (No Action), no salvage, fuel treatments, or reforestation would take place. Existing shade would remain at current levels. Shade would gradually decrease in the short-term as dead trees fall. The microclimate of the burned landscape would exhibit greater extremes in temperature, wind, and moisture than pre-fire conditions. Standing dead and downed trees would buffer this environment somewhat, as would the re-growth of shrubs and ground vegetation. However, a conifer forest capable of providing shade and cover would not return for several decades longer than would be found under Alternatives 2, 3, 4, and 5.

Effects Common to Alternatives 2, 3, and 4

Salvaging would decrease shade to approximately 4-10 % in the most intensely burned areas. The amount of shade retained would vary by alternative. The amount of material retained for snags within proposed harvest areas and outside proposed harvest areas would also vary by alternative. The lesser amount of shade due to the fire and salvaging is not expected to be a problem for reforestation. It is expected that reforestation success will be achieved through the practice of micrositing (planting in moist, shady spots, such as in the shade of stumps and down logs). If needed, artificial shade would be used on the higher severity burned south and west facing slopes and would help achieve reforestation success on those sites. More rapid reforestation (by planting) would result in a quicker return to more shade and cover than the No Action alternative provides.

Effects of Alternative 5

In this alternative, there would be no timber salvaging, but there would be piling and burning of fuels less than 7 inches dbh. The impact on shading and microclimates would be less than Alternatives 2, 3, and 4 since dead and dying trees larger than 7 inches would remain. However, the impact from this alternative would be slightly higher than Alternative 1 because of the removal of the smaller diameter fuels. The lesser amount of shade due to the fire and fuels treatment is not expected to be a problem for reforestation. It is expected that reforestation success will be achieved through the practice of micrositing (planting in moist, shady spots, such as in the shade of stumps and down logs). If needed, artificial shade would be used on the higher severity burned south and west facing slopes and would help achieve reforestation success on those sites. More rapid reforestation (by planting) would result in a quicker return to more shade and cover than the No Action alternative provides. However, fewer acres would be planted in Alternative 5 than Alternatives 2, 3, and 4, so the quicker return of shade would not occur on as many acres compared to those alternatives.

Cumulative Effects

Effects Common to Alternatives 2, 3, 4, and 5

Hardwood riparian planting is planned to be done, under a Categorical Exclusion, in severely burned (BAER severity) tributaries to Clear Creek and in a portion of Easy Creek that burned severely. This activity, in combination with conifer planting proposed in Alternatives 2, 3, 4, and 5, would increase the amount of shade in riparian areas and would benefit other resources, such as fish habitat and water quality.

Existing Condition - Reforestation of Burned Forestland

The Easy Fire has resulted in tree mortality over much of the burned area. Therefore, reforestation is a key element of the recovery project. Of the 5,839 acres within the Easy Fire perimeter, approximately 1,040 acres were in existing plantations and 40 acres were in harvest units that had not yet been planted. Due to fire damage sustained in the Easy Fire, about 653 acres of the existing plantations needed to be replanted, as well as the 29 acres of existing unplanted harvest units, for a total of 682 acres. The 682 acres of planting in the existing plantations and existing harvest units is covered by existing NEPA documents and was accomplished in the spring of 2003 and 2004.

Excluding the areas in existing plantations and existing harvest units not yet planted, there are about 4,312 acres in need of regeneration (moderate and high severity to vegetation areas) as a result of the Easy Fire. This number includes areas expected to need planting and areas expected to regenerate naturally.

Natural Recovery Areas

Forested areas that burned with light severity to vegetation, with the exception of plantations, often have substantial numbers of live trees remaining. With their continued survival, the number of live trees is sufficient to meet management objectives on the site without artificial reforestation.

There were about 250 acres of mature forest that burned with light severity, and about 45 acres of mature forest that were unburned. These areas (295 acres) are still adequately stocked, and do not need regeneration. Within these areas, small patches of trees, less than an acre or two, have been killed.

Of the 4,312 acres (outside of existing plantations and existing harvest units) that burned with moderate or high severity to vegetation that are in need of regeneration, approximately 546 acres are expected to regenerate naturally and consist mostly of lodgepole pine stands.

Planting Areas

Approximately 682 acres were replanted in 2003 and 2004 under other existing NEPA documents.

Of the 4,312 acres (outside of existing plantations and existing harvest units) needing regeneration, about 3,918 acres are expected to need replanting to meet the project's purpose and need and will be covered by this EIS.

Environmental Consequences - Reforestation of Burned Forestland

Natural Recovery Areas

Direct and Indirect Effects

Effects Common to All Alternatives (Including No Action)

Under all alternatives, planting would not take place in forested areas that still have adequate stocking of live trees. Nor, would planting take place in lodgepole pine stands that have a seed source within 800 feet since they are expected to regenerate naturally with lodgepole pine.

Forested Areas that have Adequate Stocking

In the 250 acres of mature stands that burned with light severity, ground vegetation would increase in diversity due to small-scale variations in burn intensity and its effects on the vegetation. Fire adapted species are expected to increase in the years following the fire. Other species would decrease. In general, bunch grasses and non-sprouting shrubs would decrease, while sprouting shrubs and sod-forming grasses would increase. Sufficient western larch, Douglas-fir, and ponderosa pine greater than 12"are expected to survive in these areas to meet the minimum desired stocking. Smaller trees and many of the true firs have been killed. The remaining live trees would probably have short-term decreases in growth, depending on the level of damage they sustained. Stand conditions would be more open, and within a decade, growth would probably increase due to the decreased competition from fire-killed trees.

Natural reforestation of the small patches within lightly burned areas is expected to be successful because there are abundant remaining seed sources, a mineral soil seedbed in many spots, and a brief lapse in vegetative competition. Though ponderosa pine seed is large and does not disperse well with the wind, seed crops are fairly frequent and successful reforestation can be expected in 10 years within 800 feet of seed trees in the warm dry biophysical environments. In cold dry, cool dry, and cool moist biophysical environments, it is expected that much of the natural regeneration would be grand fir, Douglas-fir (both of which are highly susceptible to root diseases) and western larch.

Lodgepole Pine Stands

Complete regeneration of the approximately 546 acres of lodgepole pine areas that burned with moderate and high severity to vegetation is likely within several years due to availability of seed sources and exposure of a seedbed. Lodgepole pine and western larch are the species most likely to regenerate in these stands. Lodgepole pine and western larch produce abundant lightweight seed that is easily dispersed and exhibit rapid juvenile growth, thus they are likely to dominate early succession. However, as a precaution, lodgepole pine stands that burned with high severity, that have interior areas that are more than 800 feet from seed sources, would be planned for planting. These areas would be inspected prior to planting to determine whether natural regeneration occurred at a sufficient level, and if so, planting would not take place.

Cumulative Effects

Effects Common to All Alternatives

There are no cumulative effects from past, present, or foreseeable actions.

Planting Areas

Direct and Indirect Effects

Effects of No Action (Natural Reforestation)

Approximately 4,312 acres are in need of regeneration. This number and the following numbers in this section do not include existing plantations that would be replanted under existing NEPA. Of the 4,312 acres there are approximately 1,622 acres that contain living trees of seed bearing age. The 800 foot seed dispersal band around areas with live trees contains about 1,726 acres that burned severely. The total area expected to naturally reforest within 2 decades (the combination of areas that contain living trees and the areas within the 800 foot seed dispersal band) totals 3,348 acres.

The area beyond the 800 foot seed dispersal zone that burned with high severity to vegetation totals about 964 acres and is expected to naturally reforest within 2 to 5 decades. This would be accomplished by gradual seed dispersal by strong winds and animals, and by seed from second-generation seed crops from trees that are growing up in the original seed dispersal zones. Ground vegetation would be very dense and seedling establishment would be more difficult due to vegetative competition. These areas may not be fully stocked for up to fifty years.

Genetic diversity would be limited because of mortality from the fire resulting in a reduced number of trees contributing seed. The resulting stands of trees would most likely be more susceptible to Armillaria root disease because they would have a higher proportion of grand fir and Douglas-fir (both of which are susceptible to Armillaria) than if the project area was planted with a mixture of species that are more resistant to Armillaria, such as western larch, and - where appropriate - western white pine and ponderosa pine.

The need to reforest the project area (NFMA and Regional Forester's 11/02 letter) would not be met through Alternative 1 (No Action) as it would take up to five decades longer.

Effects Common to Alternatives 2, 3, and 4 (Planting)

Approximately 3,918 acres are planned for planting in alternatives 2, 3, and 4. The units in Alternative 2 that are not salvaged in Alt. 3, and 4, and 5 would still be reforested by planting in those alternatives.

Table FV-4 displays the number of acres to be planted in each of the next several years after the fire for Alternatives 2, 3, and 4. These numbers are dependent on actual funding and nursery stock availability.

Table FV-4. Planned Reforestation by Year – Alternatives 2, 3, 4

Year	Riparian Planting Acres	Upland Planting Acres	Total Riparian and Upland Planting Acres
2003		298 ac. existing plantations*	298 ac. existing plantations*
2004		384 ac. existing plantations*	384 ac. existing plantations*
Subtotal of acres covered by existing NEPA		**682 ac.** (covered by existing NEPA)	**682 ac.** (covered by existing NEPA)
2005	170 ac.	1695 ac. (includes 211 ac. existing TSI units)*	1865ac. (includes 211 ac. existing TSI units)*
2006	0	1653 ac.	1653 ac.
2007	0	400 ac.	400 ac.
Subtotal of acres covered by this EIS	**170 ac.** (documented in this EIS)	**3748 ac.** (documented in this EIS)	**3918 ac.** (documented in this EIS)

*Planting in 2003 and 2004 would utilize trees sown in the nursery before the Easy Fire occurred. Bare root seedlings normally take 2 years to grow in nursery beds before outplanting. The entire acreage of plantations and timber stand improvement areas are being included in the totals, even though in some cases only portions of the plantations or TSI units, would be replanted.

Survival of planted trees is expected to be sufficient to stock these areas. Natural regeneration would supplement planted trees in those areas where it occurs, and would be the only reforestation method in some areas, such as in lodgepole stands.

Shade cards may be used on higher severity burned areas on south and west slopes throughout the project area, if needed. Shade cards, made from waxed cardboard stapled to wood stakes, reduce seedling transpiration and heat desiccation caused by solar damage on harsh sites during early establishment of seedlings. Shade cards are biodegradable and last 3 to 5 years.

Conifer species appropriate to each site would be planted and would include western larch, ponderosa pine, western white pine, and Douglas-fir (Douglas-fir would not be planted in

Armillaria root disease centers, however). Seedlings would be grown from seed collected within the seed zone that includes the Easy Fire, from the elevation band appropriate for the site. Genetic diversity would be higher in planted areas than those that naturally regenerate from the limited number of live trees that remain.

Species and spacing would differ by the Plant Association Groups:

<u>Cold Dry, Cool Dry, and Cool Moist:</u>

Species: A mix of ponderosa pine, western larch, western white pine and Douglas-fir (Douglas-fir would not be planted in Armillaria root disease centers). Lodgepole pine is expected to naturally seed in.

Spacing: Average 11' x 11' spacing.

<u>Warm Dry PAG:</u>

Species: A mix of ponderosa pine, Douglas-fir (Douglas-fir would not be planted in Armillaria root disease centers), and western larch

Spacing: Average 13' x 13' spacing.

These spacings are designed to allow the trees room to grow without needing precommercial thinning to maintain adequate growth rates. This is wider than normal spacing, and will allow for more natural ground and shrub vegetation to become established. The spacings are to be varied to duplicate the irregular patterns of natural reforestation and to produce variable densities in the future. Non-reforested areas up to one acre in size are permissible, to provide diversity and wildlife forage. As addressed below, seedling mortality caused by competing vegetation or animal damage is accepted, within limits, providing additional vegetative diversity and wildlife forage areas. Some planting before salvage logging is planned for this project, primarily in helicopter logged units, and has been successful in the past on the Summit and Reed fires.

Seedling mortality on the district is primarily due to drought stress, competing vegetation that exacerbates drought stress or shades out the seedlings, pocket gopher damage, and big game browsing damage. Seedling survival averages 65 percent for the Malheur National Forest. Planting spacing takes this into consideration in order to achieve fully stocked stands into the future.

Reforestation survival in the project area is expected to be close to the 65 percent average if planting is accomplished within four years. If it is delayed beyond the next four years, animal damage and competing vegetation may become a problem. In such a case, animal damage protection measures and control of competing vegetation may be necessary to achieve adequate survival. In that case a new NEPA document would be prepared before vegetation or animal damage control is undertaken.

In the Sessions report on the Biscuit Fire, a fire in southwest Oregon that burned the same summer as the Easy Fire, the expectation is that planting delays beyond 2005 would substantially increase costs through poor survival and high restocking costs (Sessions et al, 2003). According to this report the most cost-efficient method of establishing conifers is immediate regeneration.

Effects of Alternative 5 (Planting)

Approximately 2,524 acres are planned for planting in Alternative 5. The acres planted would be only the areas that burned with high severity to vegetation. Effects on the acres planted would the same as for Alternatives 2, 3, and 4, but for fewer acres. Effects on the acres not planted would be the same as for Alternative 1, but for fewer acres.

Table FV-5 displays the number of acres to be planted in each of the next several years after the fire for Alternative 5. These numbers are dependent on actual funding and nursery stock availability.

Table FV-5. Planned Reforestation by Year – Alternative 5

Year	Riparian Planting Acres	Upland Planting Acres	Total Riparian and Upland Planting Acres
Planting acres covered by existing NEPA (same as in Table FV-4)		**682 ac.** (covered by existing NEPA)	**682 ac.** (covered by existing NEPA)
2004	0	211 ac. (existing TSI units)*	211 ac. (existing TSI units)*
2005	170 ac.	942 ac.	1654 ac.
2006	0	1112 ac.	1653 ac.
2007	0	300 ac.	400 ac.
Acres of planting covered by this EIS	**170 ac.** (documented in this EIS)	**2354 ac.** (documented in this EIS)	**2524 ac.** (documented in this EIS)

*Planting in 2003 and 2004 would utilize trees sown in the nursery before the Easy Fire occurred. Bare root seedlings normally take 2 years to grow in nursery beds before outplanting. The entire acreage of plantations and timber stand improvement areas are being included in the totals, even though in some cases only portions of the plantations or TSI units, would be replanted.

Cumulative Effects

All Alternatives

There are approximately 682 acres that would be planted in the project area in 2003 and 2004, utilizing available tree seedlings. These areas were analyzed in other NEPA documents and involve replanting of existing plantations and two units that were harvested but not planted. In addition to the plantations and harvest units, approximately 211 acres of timber stand improvement areas (areas that had been pre-commercially thinned) were burned or partially burned and would need to be replanted and would be covered by this EIS.

Competing Vegetation

Natural revegetation by native species is an important process in the recovery of the fire area. Early seral and fire adapted species would respond to open conditions and rapidly regenerate, providing valuable ground cover. Several species, though a natural part of the post-fire recovery, have the potential to respond so aggressively that they compete for site resources, resulting in reduced growth and survival of forest trees. It is often the most important factor limiting conifer regeneration in the Inland Northwest.

The effect of the fire has been to greatly reduce the ground vegetative competition, especially in areas that burned severely and killed the grass roots. The vegetation coverage would increase for the next several years as grass and other ground vegetation resprouts and seeds in. Planting within 4 years of the fire is expected to allow tree seedlings to become established before the ground vegetation becomes a serious competitor. Refer to the Forest Vegetation/Structure Specialist Report for more detailed information.

Direct and Indirect Effects

Effects of No Action

In this alternative, planting would not occur, thus there would be no site preparation and no control of competing vegetation. Since no manual, mechanical, or herbicide competing vegetation control measures are planned, there would be no adverse effects to worker and public health and safety.

Effects of Alternatives 2, 3, and 4

Pinegrass and sedges

On severely burned sites, grass roots have been killed. Re-establishment of grasses would be slower and would have less coverage compared to less severely burned areas, with the result that the thresholds for grasses are not likely to be exceeded. Areas that burned with moderate severity, and that occur on south or west aspects may come closer to exceeding the 30% ground coverage threshold, however, most of these areas had a fairly dense overstory that reduced the amount of ground coverage before the fire. It would take several years for grasses to become established to the point where they exceed treatment thresholds.

Snowbrush Ceanothus

All areas proposed for planting in the Easy Fire were analyzed to predict levels of competing vegetation. The greatest potential for establishment of ceanothus is in the grand fir/pinegrass and grand fir/elk sedge plant associations on southwest slopes that drain into Mossy Gulch, Easy Creek and Clear Creek, especially those that experienced high intensity burning. Units were analyzed by their biophysical environment, aspect, and burn severity. No areas with a high potential to exceed the competition thresholds for snowbrush ceanothus are anticipated in the Easy Fire area.

No manual, mechanical, or herbicide control methods are planned for control of either sod forming grasses or ceanothus. Planting by 2007 would be used to reduce the likelihood that ceanothus would seriously compete with the planted seedlings and reduce survival to unacceptable levels. There may be some non-forested areas within units as a result of ceanothus competition, but they are expected to be in small, dispersed areas that total less than 10% of the area. Total future timber production would be less, but stand structural diversity would be increased and there would be more forage produced in the openings for wildlife and cattle. Reforestation success is expected to be similar to the historical average 65 percent survival rate after 5 years on the Malheur National Forest, which would fully meet the purpose and need to reforest the project area.

Since no manual, mechanical, or herbicide application is anticipated for vegetation competition control, there would be no risks to forest worker or public health and safety.

Effects of Alternative 5

The effects on competing vegetation under Alternative 5 on the acres planted would be similar to the effects from Alternatives 2, 3, and 4. The effects on the acres not planted in Alternative 5 would be similar to Alternative 1.

Cumulative Effects

Effects Common to All Alternatives

No vegetation control treatments are planned for areas that are reforested, including the 682 acres to be planted in the spring of 2003 and 2004 under existing NEPA documents. Therefore, there would be no additional cumulative effect from this project.

Animal Damage

Animal damage control is sometimes needed for prompt reforestation of burned areas to meet management objectives. Several species that may have an impact to reforestation success are discussed below. Planting within 4 years of the fire is expected to allow the tree seedlings to become established before animal damage becomes a problem. Since irregular spacing is desired to better mimic natural regeneration it is not necessary to fully stock every area and openings of up to an acre are permissible. This will reduce the need for animal damage control. Refer to the Specialist Report or the Silvicultural Prescription for more detailed information.

Direct and Indirect Effects

Effects of No Action Alternative

In this alternative, no additional planting would occur. Thus, there would be no site preparation or control of damaging animals. Since no manual, mechanical, or herbicide control methods are planned, there would be no health or safety risks to forest workers or the public.

Effects of Alternatives 2, 3, and 4

Big Game and Livestock Damage

Damage caused by deer, elk, and cattle in plantations usually consists of browsing on top and upper branches, causing mortality, deformity, or growth losses in young trees. This type of browsing is usually most severe the in first few years after a unit is planted, gradually tapering off as the trees become established. One-year old container stock is particularly susceptible to browsing during the year of planting.

Big game repellant (BGR) may be applied to all areas to be planted (approximately 3,918 acres). BGR is made from putrefied chicken egg solids. The odor of the substance deters big game from browsing. The repellant is applied to the terminal bud and upper whorl of needles of the seedling. BGR is highly biodegradable and has not shown any adverse effects on surrounding vegetation or to animals that have ingested treated plant matter.

Livestock browsing or trampling to conifer seedlings is usually very minor, and cattle grazing would be excluded from the Easy Fire area for a minimum of 2 years to allow vegetation to recover. Therefore, no significant damage is expected to conifer seedlings from livestock.

Porcupine Damage Control

The extent and severity of the fire has reduced preferred porcupine habitat to the few areas with tree survival. Seedling damage and mortality is not expected to be over thresholds, except in very limited areas, in the next five years. Therefore, porcupine is not expected to impede progress toward reforesting burned stands.

Pocket Gopher Damage Control

The population would slowly recover as grass and forbs increase, and animals return from adjacent intact habitat. Gopher populations are not expected to recover until two or three growing seasons following the fire, and it may take longer for them to repopulate the fire interior.

Since none of the types of animal damage are expected to exceed treatment thresholds, reforestation goals should be met without any animal damage control. There may be localized damage that results in non-forested openings. Areas up to 2 acres in size and totaling less than 10% of the area are acceptable. These areas can provide increased structural diversity and forage for wildlife and grazing animals. There would be small losses in the amount of timber produced if openings are greater than ¼ acre, but the cost savings of not implementing animal damage control offset the timber loss. Since BGR is the only animal control treatment planned, there would be no health or safety risks to forest workers or the public.

Effects of Alternative 5

The effects of animal control on the areas planted under Alternative 5 would be similar to the effects for Alternatives 2, 3, and 4. The effects on the acres not planted in Alternative 5 would be similar to Alternative 1.

Cumulative Effects

Effects Common to Alternatives 2, 3, 4, and 5

BGR is the animal control treatment planned for the lands that are reforested under this EIS. However, the 682 acres of existing plantations to be re-planted in the spring of 2003 and 2004 under existing NEPA documents are planned for pocket gopher baiting. The effect would be that gopher populations would be reduced and seedling survival would be increased on those areas. This would be a short-lived effect. The areas to be treated for pocket gophers are not the same as the areas to be planted under this EIS. There would be no additional cumulative effect as a result of the Easy Fire Recovery project.

Existing Condition - Future Stand Resiliency

The Easy Fire has eliminated most of the less resilient and less sustainable forest components that existed prior to the fire. Trees that were not fire tolerant have been killed and overstocked stands have either been thinned out or totally killed. The heavier than normal fuel loads on the ground and the standing ladder fuels have been burned up. With most of the unhealthy components now gone, there is an opportunity to establish appropriate species now and to manage the stands in the future with prescribed fire and thinning to enhance long-term sustainability.

Environmental Consequences- Future Stand Resiliency

Cold Dry, Cool Dry, and Cool Moist Plant Association Groups

Direct and Indirect Effects - Fire Hazard

Effects of No Action

No salvage, no whole tree yarding, or any other fuel treatment would occur to reduce future fuel levels. Fuels would increase above historical range, fueling fires of greater size and intensity than historically would have occurred, and could kill young trees that become established.

Most of these acres would probably naturally reforest within about 10 years. Since lodgepole pine and western larch are prolific seeders with relatively light seed that disseminates well, natural reforestation would occur in these plant association groups sooner than in the warm dry group. However, areas that are not within 800 feet of a seed source could take 2 to 5 decades to regenerate naturally. With increased fuel loads, even low intensity fire would present a danger to these young trees until they reach thirty feet or more in height. Young trees would also be at risk during dry periods when stand replacement fire is very likely.

Effects Common to Alternatives 2, 3, and 4

The historical fire regime is a higher intensity stand replacement fire at longer intervals. Salvage of dead timber and reforestation of burned areas with seral species would allow re-establishment of historical stand conditions and allow the use of fire to resume its natural role in the landscape sooner than if left to occur naturally. The primary effect of the salvage would be to break the continuity of future fuel levels across the landscape, possibly reducing the size of future fires.

In Alternative 2, approximately 833 acres of the 3,228 burned acres of mature cold dry, cool dry, and cool moist stands would be salvaged (26%).

In Alternative 3 approximately 655 acres of the of the 3,228 burned acres of mature cold dry, cool dry, and cool moist stands would be salvaged (20%).

In Alternative 4, approximately 790 acres of the 3,228 acres burned acres of mature cold dry, cool dry, and cool moist stands would be salvaged (24%). The target snag level is 13 snags/acre in this alternative.

Effects of Alternative 5

No salvage would occur to reduce future large diameter fuel levels in Alternative 5. Smaller diameter fuels (less than 7 inches dbh) would be removed on 3,652 acres, but future fire severity to soils and vegetation would not be reduced, because large diameter fuels would be left on-site. Removal of the small number of small diameter trees in the fire-damaged stands would only minimally reduce the fuel loading. Fuels would increase above historical range even for the cold dry, cool dry, and cool moist plant association groups. This could fuel fires of greater size and intensity than historically would have occurred, and could kill young trees that become established.

Direct and Indirect Effects - Insects and Disease

Effects of No Action

There would be no planting in Alternative 1, so species that are more susceptible to Armillaria root disease, such as grand fir and Douglas-fir would be more prevalent in the species composition of the naturally regenerated stands in the future, compared with alternatives that propose planting. Species that have some resistance to Armillaria, such as western white pine, ponderosa pine, and western larch would be less prevalent.

Effects Common to Alternatives 2, 3, and 4.

The salvage of fire-killed timber would have little effect on the buildup of insect populations since it would not take place until over a year after the fire. This would allow populations to build up and disperse to nearby live trees before the salvage operation. Reforesting with seral species such as western larch, western white pine, and ponderosa pine would have a positive effect in the future, as they are more resistant to insect and diseases than other species that may naturally seed in the fire. Douglas-fir would also be used in the planting mix except in cold basins, frost pockets, and Armillaria root disease centers.

Effects of Alternative 5

The effects of not salvaging fire-killed timber would be similar to Alternatives 2, 3, and 4. The effects of reforesting 2, 524 acres would be similar to Alternatives 2, 3, and 4 but on fewer acres. The effect on the acres not planted in Alternative 5 would be similar to Alternative 1, but not on as many acres.

Cumulative Effects

Effects Common to All Alternatives

860 acres of cold dry, cool dry, and cool moist biophysical environment have already been harvested prior to the fire. The cumulative effect of past harvesting is that there is a potential reduction of future fire intensity and insect buildups. Reforestation of burned existing plantations with seral species such as ponderosa pine and western larch would improve resistance to fire, insects, and disease.

Warm Dry Plant Association Group

Direct and Indirect Effects - Fire Hazard

Effects of No Action

No salvage, whole tree yarding, or any other treatment would occur to reduce future fuel levels. As the fire-killed trees fall to the ground fuels would increase above historical levels for the warm dry plant association group. High fuel levels would preclude reintroduction of the low-severity, high frequency fire regime until the woody material decays, and any wildfires could kill the young natural regeneration that becomes established. Fires in the future would more likely be high severity and would kill young trees that become established.

Without planting, the areas that contain live trees or are within 800 feet of seed sources would probably naturally reforest within 2 decades. Areas outside the 800-foot seed fall zone and could take 3 to 5 decades to become reforested. Natural reforestation would be somewhat sporadic, especially in the larger patches of high severity burn. Non-forested patches of young trees would be a part of the landscape for the next century. With increased fuel loads, even low intensity fire would present a danger to these young trees until they reach thirty feet or more in height. Young trees would also be at risk during dry periods when stand replacement fire is very likely.

Effects Common to Alternatives 2, 3, and 4

Salvage of dead timber and reforestation of burned areas with seral species would allow re-establishment of historical stand conditions and allow the use of fire to resume its natural role in the landscape sooner than if left to occur naturally. These stands would be planted with a mix of ponderosa pine, western larch, and Douglas-fir. In Armillaria root rot centers, Douglas-fir would not be planted. The species mix in root rot centers would include western larch, and on appropriate sites, western white pine and ponderosa pine.

The salvaged stands could withstand low intensity fire in about 20-30 years, allowing the reintroduction of fire. Future stand structure and composition would be closer to what existed before the beginning of this century. Stands of fire-tolerant trees at lower densities and with reduced fuel loadings would be suitable for periodic underburning. As a result, future wildfires would not be as severe or as large in the project area.

In Alternative 2, approximately 944 acres of the 1,363 burned acres of mature warm dry forest stands would be salvaged (69%). This would reduce fuels in the stands where it would be the heaviest in the future, and break the continuity of fuel profiles across the landscape.

In Alternative 3, approximately 643 acres of the 1,363 burned acres of mature warm dry forest stands would be salvaged (47%). This would reduce fuels in the stands where it would be heaviest in the future, and break the continuity of fuel profiles across the landscape. Non-salvaged areas would still have high future fuel loads precluding periodic underburning in the future, and would remain at risk for high severity wildfires.

In Alternative 4, approximately 166 acres of the 1,363 burned acres of mature warm dry forest stands would be salvaged (15%). This would reduce fuels in the stands where it would be heaviest in the future, and break the continuity of fuel profiles across the landscape. Non-salvaged areas would still have high future fuel loads precluding periodic underburning in the future, and would remain at risk for high severity wildfires.

Effects of Alternative 5

No salvage would occur to reduce future large diameter fuel levels in Alternative 5. Smaller diameter fuels (less than 7 inches dbh) would be removed on 3,652 acres, but future fire severity to soils and vegetation would not be reduced, because large diameter fuels would be left on-site. Removal of the small number of small diameter trees in the fire-damaged stands would only minimally reduce the fuel loading. Fuels would increase above historical range for the warm dry plant association groups. This could fuel fires of greater size and intensity than historically would have occurred, and could kill young trees that become established.

Direct and Indirect Effects - Insects and Disease

Effects of No Action

There would be no planting in Alternative 1, so species that are more susceptible to Armillaria root disease, such as grand fir and Douglas-fir would be more prevalent in the species composition of the naturally regenerated stands in the future, compared with alternatives that propose planting. Species that have some resistance to Armillaria, such as western white pine, ponderosa pine, and western larch would be less prevalent.

Effects Common to Alternatives 2, 3, and 4

The salvage of fire-killed timber would have little effect on the buildup of insect populations since it would not take place until over a year and a half after the fire. This would allow the insect populations to build up and disperse to nearby live trees before the salvage operation. Reforestation with seral species such as ponderosa pine and western larch would have a positive effect in the future, as they are more resistant to insect and diseases than other species that may naturally seed in after the fire.

Effects of Alternative 5

The effects of not salvaging fire-killed timber would be similar to Alternatives 2, 3, and 4. The effects of reforesting 2, 524 acres would be similar to Alternatives 2, 3, and 4 but on fewer acres. The effect on the acres not planted in Alternative 5 would be similar to Alternative 1, but not on as many acres.

Cumulative Effects

Effects Common to All Alternatives

189 acres of warm dry biophysical environment have already been harvested prior to the fire. The cumulative effect of past harvesting is that there is a potential reduction of future fire intensity and insect buildups. Reforestation of the burned existing plantations with seral species such as ponderosa pine, western white pine, and larch would improve resistance to fire, insects, and disease.

Existing Condition - Stand Structural Stages

The structural stage classifications used here are consistent with the terms and methods used in the Interior Columbia Basin Ecosystem Management Project. Information on pre-fire stand structures and biophysical environments were derived from the Upper Middle Fork John Day River Watershed Assessment. The structural stages used are:

- SI – stand initiation
- SEOC – stem exclusion open canopy
- SECC – stem exclusion closed canopy
- UR – understory reinitiation
- YFSS – young forest single story (not an ICBEMP stage, used here to identify the difference between future SEOC stands with trees less than 15” DBH and larger sized SEOC stands with trees greater than 15” DBH)
- YFMS – young forest multi-story
- OFSS – old forest single story
- OFMS – old forest multi-story.

The objective of the proposed activities is to only salvage dead trees and would not have any further change on the existing post-fire structural stages. There may be incidental harvest of live trees in road or landing locations or that are removed for safety. Therefore, Regional Forester’s Eastside Forest Plan Amendment #2 does not require an analysis for structural stages. (This revised interim direction applies to all timber sales, with some exceptions, which include salvage sales). The existing and historical range of structural stages is displayed for informational purposes only.

Table FV-6 shows the range of structural stages believed to have existed before settlement by Euro-Americans. Information is derived from Powell, 1998, Umatilla National Forest Silviculturist, who did an analysis in cooperation with Charlie Johnson, the Blue Mountain Area Ecologist, and other Malheur, Umatilla, and Wallowa-Whitman National Forest Silviculturists. Figure 37, Map Section identifies post-fire structure. The historical range of variability (HRV) compares the structural stages of each biophysical environment. The structural stages are defined above.

Table FV-6: Historical Range of Variability

PAG	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
Cold Dry	1-20%	0-5%	5-20%	5-25%	10-40%	0-5%	10-40%
Cool-Dry	5-30%	0-5%	5-35%	5-20%	5-20%	1-10%	1-20%
Cool Moist	1-10%	0-5%	5-25%	5-25%	40-60%	0-5%	10-30%
Warm Dry	5-15%	5-20%	1-10%	1-10%	5-25%	15-55%	5-20%

Table FV-7 shows the current (post-fire) condition of the stand structures within the Easy Fire. See Figure 37, Map Section, for structural stages.

Table FV-7: Stand Structural Stages, Easy Fire Project Area

PAG	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
Cold Dry	69%	0%	8%	16%	7%	0%	0%
Cool-Dry	81%	0%	1%	17%	1%	0%	0%
Cool Moist	39%	0%	7%	50%	4%	0%	0%
Warm Dry	47%	10%	0%	40%	3%	0%	0%

As shown in the above tables, some biophysical environments within the Easy Fire project area are out of balance with the historical range of structural stages. Generally, the Easy Fire caused a large number of acres in older structures, such as OFMS, to move to younger structural stages, such as SI, UR, SECC, or SEOC. This is due to the large amount of stand replacement fire.

For each structural stage, it is considered favorable if current conditions are within or above the historical range of variability. It is desirable to move towards HRV as soon as possible, especially toward old forest conditions if they are below HRV.

Environmental Consequences - Stand Structural Stages

Direct and Indirect Effects

Effects of No Action

The approximately 3,348 acres within the seed dispersal zone are expected to reforest naturally within 20 years. The seed dispersal zone has 1,622 acres with some live trees and

1,726 acres within 800’ of live trees. On the other 964 acres that are located farther from seed sources it is estimated that it would take 20 to 50 years for trees to become established and start to grow. Therefore, development of structural stages would be delayed due the lag in reforestation both in the seed dispersal zone and outside of it. In addition, because there would be no planting of species that have some resistance to Armillaria root disease, the future stands would have more grand fir and Douglas-fir than in Alternatives 2, 3, 4, and 5, resulting in more mortality to root disease, further delaying development of structural stages.

It is estimated that approximately 83% of the project area would attain old forest conditions (OFSS and OFMS) within 150 years (assuming no stand disturbances occur). About 17% of the project area (the 964 acres that burned severely outside of the 800’ seed dispersal zone) would still be in young forest structures (YFSS and YFMS) until about 200 years from now.

Table FV-8 shows the predicted structural stages at 50, 100, and 150 years from now.

Table FV-8 Future Structural Stages for No Action

	SI	SEOC	SECC	UR	YFSS	YFMS	OFSS	OFMS
Existing	64%	2%	2%	29%		3%		
50 Years	17%	14%	33%			29%	4%	3%
100 Years		17%			47%	29%	4%	3%
150 Years					17%		51%	32%

Effects Common to All Alternatives (including No Action)

Existing (post-fire) structural stages of stands would not change in the short term as a result of implementing any of the alternatives, because even the alternatives that propose salvage activities would only harvest dead and dying trees. Alternative 5 only proposes cutting dead fuels less than 7” diameter, so it also would not affect future stand structural stages.

Effects Common to Alternatives 2, 3, 4, and 5

Species compositions would change following treatment, which would affect stand structure in the long term. The most notable change would be reduction in the proportion of grand fir and Douglas-fir in future stands, compared to No Action and the areas in Alternative 5 that are not planted. Species with some resistance to Armillaria root disease such as western larch, western white pine, and ponderosa pine would occur in higher proportions. The beneficial effect from the change in species composition would be slightly less for Alternative 5 due to the reduced acreage of planting proposed, compared with Alternatives 2, 3, and 4.

The reduction of the regeneration lag, as compared with Alternative 1, would result in development of older forest structural stages sooner as compared with the No Action alternative. It is estimated that 100% of the project area would be in the old forest structures (OFSS and OFMS) within 150 years (assuming no stand disturbances occur).

Table FV-9 shows the predicted structural stages at 50, 100, and 150 years from now for Alternatives 2, 3, 4, and 5.

Table FV-9 Future Structural Stages for Alternatives 2, 3, 4, and 5

	SI	SEOC	SECC	UR	YFSS	YFMS	OFSS	OFMS
Existing	64%	2%	2%	29%		3%		
50 Years		19%	45%			29%	4%	3%
100 Years					64%	29%	4%	3%
150 Years							68%	32%

Cumulative Effects

Common to All Alternatives

The past harvesting in the project area has resulted in about 1,080 acres presently in the stand initiation stage. This combined with the effect of the Easy Fire, increases the amount of area in stand initiation and decreases the amount of area in older structural stages. There are no other cumulative effects from past, present, or foreseeable actions.

The following graphs (Figures FV 1 – FV 3) compare the predicted stand structural stage composition 50, 100, and 150 years into the future for the No Action and the Action Alternatives (Alternatives 2, 3, 4 and 5).

Figure FV-1: Predicted Structural Stages – 50 years

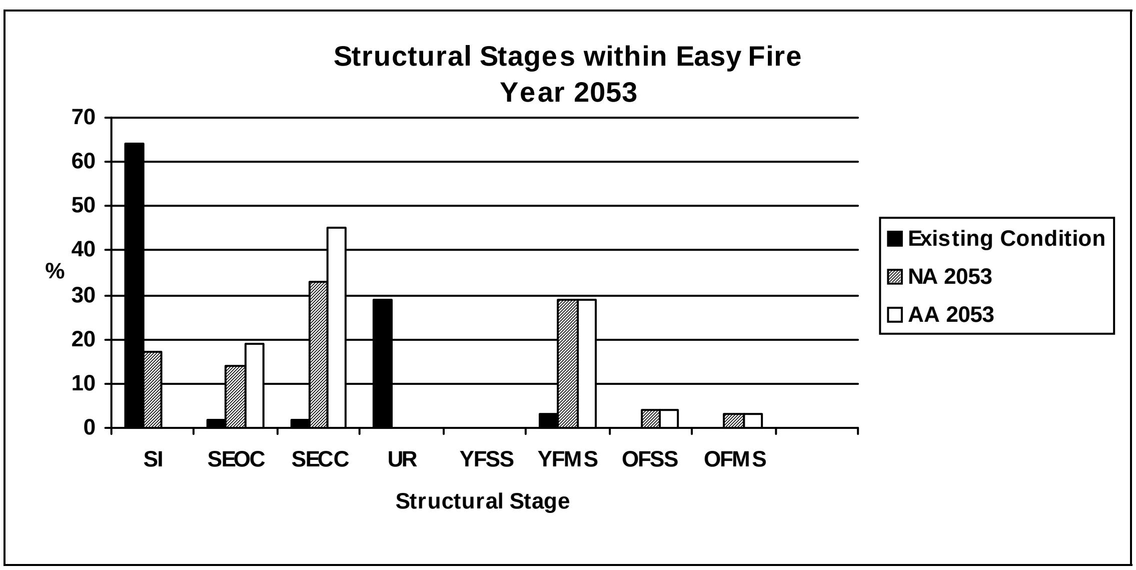


Figure FV-2: Predicted Structural Stages – 100 years

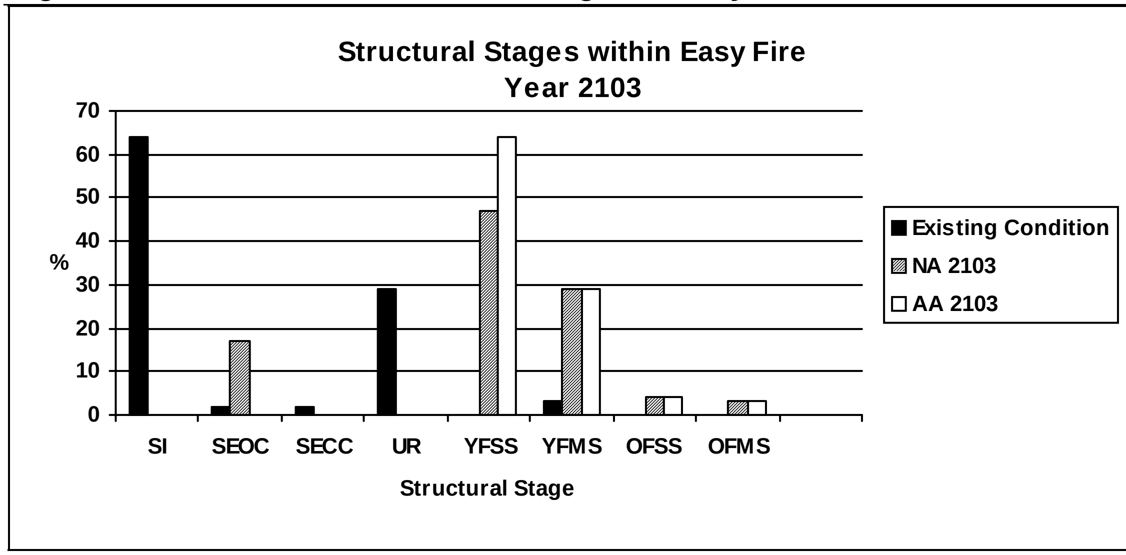
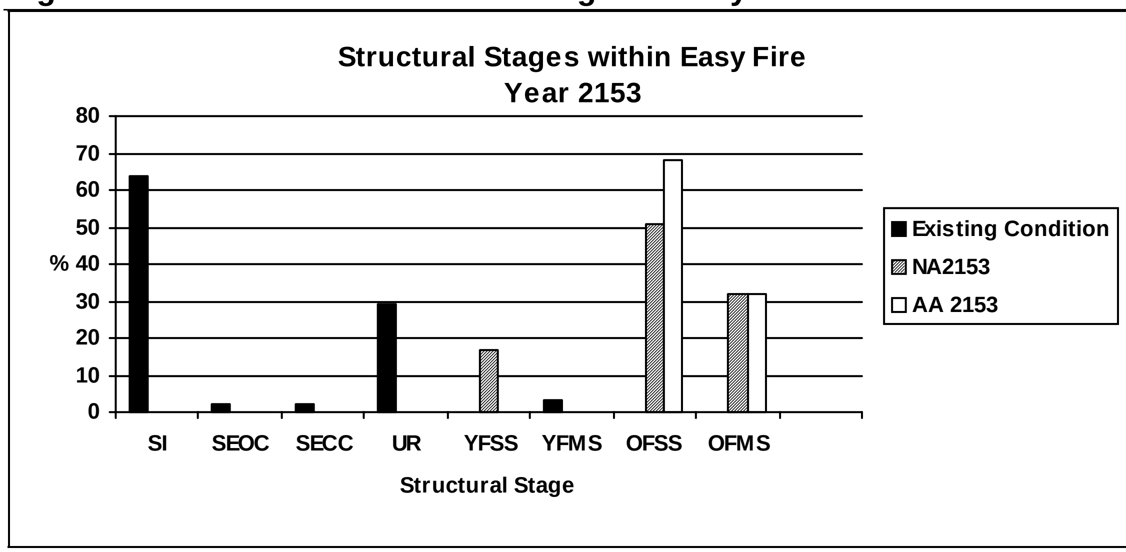


Figure FV-3: Predicted Structural Stages – 150 years



NA = No Action, AA = Action Alternatives

Consistency with Direction and Regulations

NFMA (Regional Forester's Letter, 2002)

The No Action Alternative does not meet direction to reforest areas as soon as possible in severely burned areas. If the No Action Alternative were selected in this analysis, further analysis to meet the intent of the Regional Forester's direction sooner would be conducted under a different NEPA document. Alternatives 2, 3, and 4 meet direction that salvaged areas shall be reforested within 5 years and other deforested areas be reforested as soon as possible. Alternative 5 meets the direction that all deforested areas will be reforested as soon as possible either by artificial or natural regeneration sooner than Alternative 1.

Forest Plan

The No Action Alternative does not meet the Forest Plan direction to establish ponderosa pine (and other early seral species) in appropriate sites to increase fire, insect, and disease resiliency. The Action Alternatives all meet the direction to minimize losses due to insects and disease by establishing ponderosa pine and western larch where they are appropriate within 5 years after harvest. Both natural regeneration and planting are utilized to reforest the burned areas and seed used to grow the seedlings is collected from superior trees within the seed zone and elevation band.

Regional Forester Forest Plan Amendment #2 (Eastside Screens)

All alternatives meet the direction not to decrease old forest structural stages Alternatives 2, 3 and 4 better meet the objective to shorten the time to grow additional old forest structure. Stands would reach old forest structural stages more quickly in response to these prescriptive treatments since planting would establish trees 10 to 40 years sooner than would natural regeneration. Alternative 5 shortens the time required to grow additional old forest structures in severely burned areas by planting seedlings. The moderately and lightly burned areas would be regenerated naturally within 5 to 10 years where available seed sources exist. None of the alternatives would remove green trees (except for incidental green trees cut for road and landing construction and for safety.

The type of timber sales proposed in Alternatives 2, 3, and 4 are exempt from the interim ecosystem standards including HRV under Amendment #2. These sales are salvage of dead and dying trees with incidental green volume.

Irreversible and Irretrievable Commitments of Resources

Irreversible Commitments

There are no anticipated long-term irreversible commitments of the forest vegetation since it is renewable as long as the soil productivity is maintained. There may be short-term losses of growth related to soil compaction, but compaction is to be kept below 20% of the forest area, and the growth reduction on compacted ground is about 15%. This would result in a total maximum growth loss of approximately 3% of the growth potential until the compaction gradually diminished (in about 50 years).

Irretrievable Commitments

There are irretrievable commitments of the growth of forest vegetation for about 5 years because of the new landings and roads that are built for the salvage operation. They are to be rehabilitated after use, but there would be a lag in reforestation and growth since the sites are impacted more heavily than the surrounding forestland.